MULTI-BIT PHASE SHIFTERS USING MEM RF SWITCHES

ABSTRACT OF THE DISCLOSURE

An RF phase shifter circuit includes first and second RF ports, and a switch circuit comprising a plurality of micro-electro-mechanical ("MEM") switches responsive to control signals. The switch circuit is arranged to select one of a plurality of discrete phase shift values introduced by the phase shifter circuit to RF signals passed between the first and second RF ports. The circuits can be connected to provide a single-pole-multiple-throw (SPMT) or multiple-pole-multiple-throw (MPMT) switch function. The phase shifter circuits can be used in an electronically scanned array including a linear array of radiating elements, with an array of phase shifters coupled to the radiating elements. An RF manifold including a plurality of phase shifter ports is respectively coupled to a corresponding phase shifter RF port and an RF port. A beam steering controller provides phase shift control signals to the phase shifters to control the phase shift setting of the array of the phase shifters. The SPMT and MPMT switch circuits can be employed in other applications, including switchable attenuators, switchable filter banks, switchable time delay lines, switch matrices and transmit/receive RF switches.